

CLAIMS

What is claimed is:

1. A drop emitting device comprising:
an electromechanical drop generator;
a drop firing waveform applied to the electromechanical drop generator over a drop firing interval; and
the drop firing waveform including in sequence a first pulse of a first polarity having a duration in a range of about 5 microseconds to about 10 microseconds, a pulse of a second polarity having a duration in a range of about 7 microseconds to about 14 microseconds, and a second pulse of the first polarity having a duration in a range of about 5 microseconds to about 8 microseconds.
2. The drop emitting device of claim 1 wherein the first pulse of the first polarity has a generally triangular shape.
3. The drop emitting device of claim 1 wherein the first pulse of the first polarity has a generally trapezoidal shape.
4. The drop emitting device of claim 1 wherein the first pulse of the first polarity has a peak magnitude that is less than about 30 volts.
5. The drop emitting device of claim 1 wherein the pulse of the second polarity has a peak magnitude that is less than about 40 volts.
6. The drop emitting device of claim 1 wherein the second pulse of the first polarity has a peak magnitude that is less than about 40 volts.

7. The drop emitting device of claim 1 wherein the electromechanical drop generator comprises a piezo transducer.

8. The drop emitting device of claim 1 wherein the electromechanical drop generator includes a transducer that is selected from the group consisting of a shear-mode transducer, an annular constrictive transducer, an electrostrictive transducer, an electromagnetic transducer, and a magnetostrictive transducer.

9. The drop emitting device of claim 1 wherein the drop firing interval is no greater than about 56 microseconds.

10. The drop emitting device of claim 1 wherein the drop firing interval is in the range of about 28 microseconds to about 56 microseconds.

11. A drop emitting device comprising:
a drop generator;
a drop firing waveform applied to the drop generator over a drop firing interval; and
the drop firing waveform including in sequence a first pulse of a first polarity, a pulse of a second polarity, and a second pulse of the first polarity, wherein the first pulse of the first polarity has a generally triangular shape.

12. A drop emitting device comprising:
a drop generator;
a drop firing waveform applied to the drop generator over a drop firing interval; and
the drop firing waveform including in sequence a first pulse of a first polarity, a pulse of a second polarity, and a second pulse of the first polarity, wherein the first pulse of the first polarity has a peak magnitude that is less than about 30 volts.

13. A drop emitting device comprising:
a drop generator;
a drop firing waveform applied to the drop generator over a drop firing interval that is no greater than about 56 microseconds; and
the drop firing waveform including in sequence a first pulse of a first polarity, a pulse of a second polarity, and a second pulse of the first polarity.

14. A drop emitting device comprising:
an electromechanical drop generator;
a drop firing waveform applied to the electromechanical drop generator over a drop firing interval; and
the drop firing waveform including in sequence a first pulse of a first polarity having a peak magnitude that is less than about 30 volts but not less than about 20 volts, a pulse of a second polarity having a peak magnitude that is less than about 40 volts but not less than about 35 volts, and a second pulse of the first polarity having a peak magnitude that is less than about 40 volts but not less than about 35 volts.

15. A drop emitting device comprising:
an electromechanical drop generator;
a drop firing waveform applied to the electromechanical drop generator over a drop firing interval; and
the drop firing waveform including in sequence a first pulse of a first polarity having a peak magnitude in the range of about 20 volts to about 35 volts, a pulse of a second polarity having a peak magnitude in the range of about 35 volts to about 45 volts, and a second pulse of the first polarity having a peak magnitude in the range of about 35 volts to about 45 volts, wherein the first pulse of the first polarity has a duration that is less than a duration of the pulse of the second polarity or the second pulse of the first polarity.

16. A drop emitting device comprising:
an electromechanical drop generator;
a drop firing waveform applied to the electromechanical drop generator over a drop firing interval; and
the drop firing waveform including in sequence a first pulse of a first polarity having a peak magnitude in the range of about 20 volts to about 35 volts, a pulse of a second polarity having a peak magnitude in the range of about 35 volts to about 45 volts, and a second pulse of the first polarity having a peak magnitude in the range of about 35 volts to about 45 volts, wherein the first pulse of the first polarity has a generally triangular shape.

17. A drop emitting device comprising:
 - an electromechanical drop generator;
 - a drop firing waveform applied to the electromechanical drop generator over a drop firing interval that is no greater than about 56 microseconds; and
 - the drop firing waveform including in sequence a first pulse of a first polarity having a peak magnitude in the range of about 20 volts to about 35 volts, a pulse of a second polarity having a peak magnitude in the range of about 35 volts to about 45 volts, and a second pulse of the first polarity having a peak magnitude in the range of about 35 volts to about 45 volts.
18. A method of operating a drop emitting generator having a pump chamber and a transducer, comprising:
 - causing melted solid ink to flow into the pump chamber; and
 - applying to the transducer during a fire interval a drop firing waveform that includes in sequence a first pulse of a first polarity, a pulse of a second polarity and a second pulse of the first polarity, wherein the first pulse of the first polarity has a duration that is less than a duration of the pulse of the second polarity or the pulse or the second pulse of the first polarity.
19. A method of operating a drop emitting generator having a pump chamber and a transducer, comprising:
 - causing melted solid ink to flow into the pump chamber; and
 - applying to the transducer during a fire interval a drop firing waveform that includes in sequence a first pulse of a first polarity, a pulse of a second polarity and a second pulse of the first polarity, wherein the first pulse of the first polarity has a generally triangular shape.

20. A method of operating a drop emitting generator having a pump chamber and a transducer, comprising:

causing melted solid ink to flow into the pump chamber; and

applying to the transducer during a fire interval a drop firing waveform that includes in sequence a first pulse of a first polarity, a pulse of a second polarity and a second pulse of the first polarity, wherein the first pulse of the first polarity has a peak magnitude that is less than about 30 volts.

21. A method of operating a drop emitting generator having a pump chamber and a transducer, comprising:

causing melted solid ink to flow into the pump chamber; and

applying to the transducer during a fire interval a drop firing waveform that includes in sequence a first pulse of a first polarity, a pulse of a second polarity and a second pulse of the first polarity, wherein the drop firing interval is no greater than about 56 microseconds.